

REMARKS/ARGUMENTS

Favorable reconsideration of this application, in view of the above amendments and following remarks, is respectfully requested.

Claims 1-8 and 10-54 are pending in this application. By this Amendment, Claims 1, 5-9, 11-16, 22, 32, and 35-42 are amended; Claims 52-54 are added; and Claim 9 is canceled without prejudice or disclaimer. Support for the amendments to Claims 1, 5, 14, 15, 32, 41, and 42, and for new Claims 52 and 54, may be found in the filed specification at page 6, lines 5-19 and in Examples 11, 12, 14, 15, and 16, for example. Support for new Claim 53 may be found in Claim 35, as previously presented, for example. Support for the amendments to Claims 6-8, 11-13, 16, 22, and 35-40 is self-evident. It is respectfully submitted that no new matter is added by this Amendment.

In the outstanding Office Action, Claims 11-15, 35, and 38-42 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite; Claims 1-8, 11-12, 32, 34, 35, 38, and 39 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. to 6,353,501 Woodruff et al. (hereinafter “Woodruff”); Claims 1, 3-9, 32, and 37 were rejected under 35 U.S.C. § 102(b) as anticipated by WO 00/40402 to Tachibana et al. (hereinafter “Tachibana”); Claims 4 and 5 were rejected under 35 U.S.C. § 103(a) as obvious over Woodruff; Claims 2, 10, 13-15, 34-36, and 40-42 were rejected under 35 U.S.C. § 103(a) as obvious over Tachibana; and Claims 40-42 were rejected as obvious over Tachibana in view of Woodruff.

At the outset, Applicants note with appreciation the courtesy of an interview conducted with Examiner Lauren Robinson and her Supervisor Timothy Speer. In accordance with M.P.E.P. § 713.04, and in combination with the Interview Summary provided by Examiner Robinson, the substance of the interview is substantially summarized herein.

As discussed during the interview, the rejection under 35 U.S.C. § 112, second paragraph, is overcome by virtue of the above clarifying amendments to Claims 1, 11-15, 32, 38-41, and 42, which removed the phrase “functional feature” from Claims 11-15, 38-41, and 42. Amended Claims 1 and 32 now recite “functional substacks of layers,” and Claims 11-15, and 38-42 now reference the functional substacks. Further, the phrase “between 28 and 64 nm in a thin-film stack comprising at least four silver-based functional layers” was deleted from Claim 35 and is now recited, in amended form, in new Claim 53. In light of these amendments, it is respectfully requested that the rejection under 35 U.S.C. § 112, second paragraph, be withdrawn.

The rejections under 35 U.S.C. § 102(b) and § 103(a) are respectfully traversed by the present response.

Amended independent Claim 1 is directed to a transparent substrate including, in part:

a glass substrate provided with a thin-film stack
including at least three functional substacks of layers, each of
the functional substacks having a silver-based functional layer,
and at least one of the functional substacks having a structure
including
a lower dielectric layer,
the silver-based functional layer,
an upper dielectric layer, and
an upper layer of Si₃N₄, AlN, or a mixture of Si₃N₄
and AlN.

Further, amended independent Claim 32 is directed to a transparent substrate
including, in part,

a transparent glass substrate including a thin-film stack
having at least three functional substacks of layers, each of the
functional substacks including a silver-based functional layer,
and at least one of the functional substacks having a structure
including
a lower dielectric layer,
the silver-based functional layer,
an upper dielectric layer, and
an upper layer of Si₃N₄, AlN, or a mixture of Si₃N₄
and AlN.

Woodruff and Tachibana, taken alone or in proper combination, fail to disclose at least three functional substacks of layers, each of the functional substacks having a silver-based functional layer, and at least one of the functional substacks having a structure including a lower dielectric layer, the silver-based functional layer, an upper dielectric layer, and an upper layer of Si_3N_4 , AlN , or a mixture of Si_3N_4 and AlN , as recited in Claims 1 and 32.

As discussed during the interview, Woodruff is directed to film stacks that include substacks with the following structure:

dielectric layer/metal layer/sacrificial layer/dielectric
layer (*see* Fig. 1), or
dielectric layer/metal layer/1st sacrificial layer/2nd
sacrificial layer/dielectric layer (*see* Fig. 2),

where, the upper dielectric layer is shared with the next substack. Woodruff fails to disclose a substack including both a dielectric layer **and** an upper layer of Si_3N_4 , AlN , or a mixture of Si_3N_4 and AlN , as recited in Claims 1 and 32. Moreover, the skilled artisan would not have been motivated to modify the above noted substacks to include an upper layer of Si_3N_4 , AlN , or a mixture of Si_3N_4 and AlN because its inclusion would have prevented the upper dielectric layer from being shared with the next adjacent stack, and such a change would require substantial reconfiguration of the thin film stack (addition of at least two additional layers for each substack). Moreover, Woodruff does not provide any teaching, suggestion, or motivation for incorporating an upper layer of Si_3N_4 , AlN , or a mixture of Si_3N_4 and AlN , in addition to the dielectric layer it describes, but rather is completely silent as to Si_3N_4 , AlN , or a mixture of Si_3N_4 and AlN .

As discussed during the interview, Tachibana is directed to film stacks that include substacks with the following structure:

dielectric layer/metal layer/dielectric layer/Ti-based layer (*see* Table 9, for example)

However, similar to Woodruff, Tachibana fails to disclose a substack that includes an upper dielectric layer **and** an upper layer of Si_3N_4 , AlN, or a mixture of Si_3N_4 and AlN. Tachibana also does not provide any teaching, suggestion, or motivation for incorporating an upper layer of Si_3N_4 , AlN, or a mixture of Si_3N_4 and AlN, in addition to the dielectric layers it describes. Moreover, as discussed during the interview, Tachibana states that it is particularly preferred that the metal layer be sandwiched between **two** interlayers so the highest visible light transmittance can be obtained.¹ Thus, the skilled artisan would not have discouraged from adding an additional layer, as each additional layer increases the amount of material that light has to pass through, and thus reduces the visible light transmittance that can be obtained. Therefore, it would not have been obvious to add an upper layer of Si_3N_4 to the substack of Tachibana.

Furthermore, as discussed during the interview, the examples of substituting ZnO for Si_3N_4 provided by the outstanding Office Action on page 10, line 14, and on page 13, line 8, fail to cover a functional substack including an upper dielectric layer **and** an upper layer of Si_3N_4 , AlN, or a mixture of Si_3N_4 and AlN as recited in Claims 1 and 32. The example includes successive substacks of ZnO/Ag/ZnO/TiO₂ and a final upper substack of ZnO/Ag/ Si_3N_4 . The successive substacks of ZnO/Ag/ZnO/TiO₂ do not include an upper layer of Si_3N_4 , AlN, or a mixture of Si_3N_4 and AlN. Furthermore, the final upper substack of ZnO/Ag/ Si_3N_4 does not include an upper dielectric layer (e.g. ZnO) **and** an upper layer of Si_3N_4 , AlN, or a mixture of Si_3N_4 and AlN.

¹ Tachibana at par. [0062], for example.

As discussed during the interview, new Claims 52 and 54, which respectively depend from Claims 1 and 32, recite each of the functional substack having a structure including a lower dielectric layer, the silver-based functional layer, an upper dielectric layer, **and** an upper layer of Si₃N₄, AlN, or a mixture of Si₃N₄ and AlN. Woodruff and Tachibana fail to disclose a functional substack including an upper dielectric layer and an upper layer of Si₃N₄, AlN, or a mixture of Si₃N₄ and AlN, as discussed above regarding Claims 1 and 32. Thus, Woodruff and Tachibana are further distinguished as they undeniably fail to disclose **each** functional substack including an upper dielectric layer, and an upper layer of Si₃N₄, AlN, or a mixture of Si₃N₄ and AlN. Further, Claim 13 recites that the at least one of the functional substacks has the following structure: ZnO/Ag/ . . . ZnO/Si₃N₄, and Claim 40 recites that each of the functional substacks has the following structure: ZnO/Ag/Ti/ZnO/Si₃N₄. As discussed above with reference to Claims 1 and 32, Woodruff and Tachibana fail to disclose a functional substack that includes both an upper ZnO and Si₃N₄ layer. Thus, it follows that they fail to disclose **each** functional substack including both an upper ZnO and Si₃N₄ layer. Therefore, Claims 13, 40, 52, and 54 further patentably distinguish over the cited art at least for their dependency from underlying independent claims and for the features they recite.

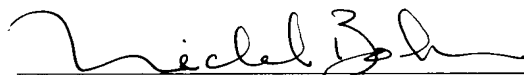
Therefore, Woodruff and Tachibana, taken alone or in combination, fail teach or suggest each and every feature recited in amended independent Claims 1 and 32. Thus, it is respectfully submitted that independent Claims 1 and 32, and all claims depending therefrom, patentably distinguish over the cited art, and it is respectfully requested that the rejections under 35 U.S.C. § 102(b) and § 103(a) be withdrawn.

Consequently, for the reasons discussed in detail above, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. Therefore, a Notice of Allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below-listed telephone number.

Respectfully submitted,

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